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ABSTRACT

The results of a field study, a controlled experiment, and clinical observations on the educational effects of "Sesame Street" on Israeli children are summarized in this report. An overview section presents the general format and major findings, the next section describes the background setting of the studies, a method section covers the procedures used. The measures, their administration, and the encouragement treatment of the field study are discussed in the next sections. A results section presents the main findings of the three studies, concluding that the findings showed a very strong effect of Sesame Street on most of the ability measures employed, but that the observed effects of the program were due mainly to the intelligent viewing of it. (SH)

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EDUCATIONAL EFFECTS OF "SESAME STREET" ON ISRAELI CHILDREN

(Brief Summary)

Gavriel Salomon

and

S. Eglstein, R. Finkelstein, I. Finkelstein, E. Mintzberg, D. Malve and L. Velner

September 1972

This is the first draft of a summary report. A detailed final report will follow. Comments and suggestions are welcome.

EM 010 623

This is a first draft summary report of only the major findings. For the sake of brevity, many important and interesting findings of a secondary order have been deleted. Nor are theoretical issues discussed here since they require a more complete report.

The authors wish to thank the teachers, children and parents who took part in the study as well as the Children's Television Workshop in New York and the Israel Institute for Applied Social Research for their help and encouragement.

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Educational Effects of *Sesame Street* on Israeli Children

Gavriel Salomon
and
S. Eglstein, R. Finkelstein, I. Finkelstein,
E. Mintzberg, D. Malve and L. Velner.

Overview

Sesame Street was broadcast in Israel for four months, twice a week. The study herein reported was designed to examine its educational and psychological effects on 5 year-olds (kindergarten), 7 and 8 year-olds (Grades 2 and 3).

The study had three components:

(a) A field study (317 children) in which the children were pretested, followed by six intermediate exposure and comprehension measures of the show and finally were posttested. The main purpose of the field study was to examine the net contribution of exposure to the program to the children's posttest performance on a number of cognitive tests.

(b) A controlled experiment in which additional effects of the program could be studied (n = 75).

(c) "Clinical observations" of children's (n = 36) viewing behaviour, particularly changes in their attention and inattention to the program's segments.

Major Findings

(a) Exposure

1. Grades 2 and 3 (G-2 and G-3) children and middle class children viewed the program more, enjoyed it more, and comprehended it better.

2. There was a decrease in viewing and enjoyment over time.

3. However, older and middle class children showed a larger drop in viewing and enjoyment than younger and low SES children. The latter had a late start with the program but then showed an upward trend in viewing, enjoyment and comprehension.

   It was suggested that older children grasp the format of the program rather quickly but then find its content to be childish for them, hence the decrease in their viewing and enjoyment.

4. Inattention to specific segments dropped over time while active involvement in the show increased.

5. Active involvement of older, middle class children, decreased while that of low SES youngsters continued to increase, indicating that while the program played to the interests of the latter, it ceased to do so for the former.

6. Segments of the program which were "didactic" and had a strong verbal component where associated with the most inattention. Segments which entailed more visual variability and were non-didactic aroused more active involvement. Among the former we find films, stories, geometric forms and the like. Among the latter we find the numbers 1-10, Ernie and Bert, Budd and Jim, and Solomon Grundy.

7. The drop in G-3 children's interest in the show may be attributed to the repeated showing of segments which were "boring". That is, a "boring" segment which is often repeated causes a general loss of interest.

(b) Effects of the program

8. The net contribution of the program to children's posttest performance was determined by using Multiple Regression techniques. These enable us to partial out the effects of background variables and pretest scores and hence find the amount of posttest variance which can be solely attributed to exposure.

9. Exposure to the show had significant effects on posttest performance on all posttests in the goal-areas* in the kindergarten (KG) group. The contributions of the program ranged from about 18% (Matching Numbers and Relational Concepts) of low SES posttest performance to 4.2% (on Relational Concepts) of the middle class posttest performance.

10. Low SES, KG children gained more than middle class ones on most tests. The exceptions were on Parts of the Whole and Classification in which middle class youngsters gained more. It was hypothesized that low SES would benefit more as long as analytic abilities are concerned, while middle class children would benefit more in terms of abilities of synthesis.

11. Encouraging parents to watch the program with their children made a large contribution to low SES children's amount of viewing, enjoyment and comprehension. This manipulation had no effect on middle class children. Nor did encouraging parents have a direct effect on learning from the show. It did, however, "erase" or decrease the impact of SES differences on the amount learned from the program.

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* That is, the cognitive functions which the program intended to affect

12. Grade-School children benefitted far more from the program than KG children.

13. Among grade-school children, the middle class ones benefitted more than low SES children on all tests, but one. On this one (CEFT) low SES children benefitted more. It was also the only clearly analytic test thus corroborating a previously mentioned hypothesis (see 10).

14. Gains of rather large magnitude (23.7% to 9.1% of the posttest variance) appeared in the goal areas as well as in measures of "media literacy" which were not included in the original list of the program's objectives.

15. G-2 children gained less than G-3 children on all tests but one. The gains of the latter were surprisingly large (up to 31% of the Classification Test accounted for by Exposure to the Program).

16. In the controlled experiment, children exposed to a relatively large dose of "Sesame Street" became significantly less perseverent but significantly better able to learn from a new instructional film.

17. Initial (pretest) ability scores were highly associated in the KG group with both Exposure and with Posttest performance. However on most tests, it was the initially less able children who benefitted more from the show. Thus although initial ability contributed directly to exposure (those who knew more watched and comprehended more), it did not effect directly gains from the show. Low SES, KG children who received lower pretest scores benefitted from the show more than middle class youngsters.

18. The associations between initial ability and Exposure or posttests were far weaker in grade school. Also there were found no clear relationships between initial ability and gains from the show.
19. Enjoyment of the show contributed rather little to posttest performance, except for the low SES, KG group. In that group it made a moderate contribution to learning.
20. In all groups, it was the intelligent viewing of the show (as measured by a Sesame Street Retention Test) which had the largest effect.

Background

Sesame Street was brought to Israel in the fall of 1971 to be broadcasted twice a week over the national television network. Its showing was accompanied by a narration superimposed in Hebrew.

Israeli children, before the showing of Sesame Street had relatively little experience with television . Israeli TV began in 1968 with four hours of transmission every evening, out of which not more than 30 minutes were directed to children. These programs for children have been of the rather traditional, narrative-continuous type (e.g. Lassie or Flipper).

Children also had the opportunity to watch daily ITV programs which were closely tied to school curricula and were therefore didactic in nature.

Sesame Street, the commercial-like, mosaic-like rapid show, so uniquely structured to utilize the virtues of the medium, was addressed to children who were everything but "media literate". Therefore numerous questions were posed which justified an intensive investigation of the program's effects.

What effects could the program have on the viewing audience? Measurable

effects could be of several kinds. Firstly, there are effects on voluntary exposure to the program, enjoyment of it, attention to its segments and, of course comprehension of its contents. These are aspects of importance to any broadcaster, but they also reflect the way an audience reacts to a program. The viewers may be sufficiently able to comprehend the content of the program but the format may be too demanding. Or on the other hand, the viewers may in fact find the mosaic format highly enjoyable but because of its nature, it may hinder the extraction of the intended information.

Second, and more important are the possible effects of the program on mental skills. Two categories of effects can be hypothesized to exist: (a) Those cognitive skills which the producers of the show intended to affect, e.g. classification ability, and the like. (b) Other skills which were not aimed at, but which still may be affected by the show, particularly when transferred to a new kind of audience. More specifically, in this category are the effects on "media literacy", i.e. the ability to perform the necessary operations of information extraction which are required by the "language" and format of the medium, as utilized in this program. If the show is indeed as novel to non-American children, as might be expected, then it must therefor be quite demanding. In that case one would expect an improvement of those mental functions which are called upon by the program.

Further questions can be raised. For example, who profits more from the program? Given different ages, different levels of initial ability, different amounts of previous exposure to TV, and different SES levels, differential amounts of exposure, enjoyment and comprehension could be expected. Consequently, also differential cognitive effects may be expected.

Unfortunately, we know very little indeed about the cognitive requirements and effects of ETV, particularly when wrapped up in commercial forms and broadcasted over a mass system. The possible effects on aggression by American TV broadcasting is but the only area which has received serious attention. Also learning outcomes from ITV have been investigated, but the quality of that research has been badly critisized (e.g. Mielke, 1968; Allen, 1970). The study of cognitive effects of mass television has been neglected altogether, with the exception of Ball and Bogatz's evaluation studies (1970, 1971) of Sesame Street. But even the latter were limited to only the intended effects of the program. The broadcasting of Sesame Street in Israel was a unique opportunity to begin an investigation of such effects, as well as effects on "media literacy".

However, studying the cognitive effects of a TV show over time poses several problems. For one, children change over time and their cognitive skills improve regardless of viewing any specific TV show. Thus one must separate those changes due to maturation, schooling and the like, from those which can be attributed unequivocally to the exposure to the show. In other words, only those changes which are associated with exposure to the program would be of interest. Any other changes are to be partialed out.

These considerations determined the design of the study.

Method

Design

The study entailed three types of investigation: A field study, "clinical observations", and a controlled experiment.

(a) The field study

371 children of the ages 5 (KG), 7 (Grade 2) and 8 (Grade 3) in the Jerusalem area served as the study sample. Half were culturally deprived, of low SES, and the other half were drawn from middle class homes.

The study was done in three stages: (i) A pretest battery of cognitive tests; (ii) ongoing measures of exposure to the show during the four months period of broadcasting; and (iii) a posttest battery of cognitive tests. (Measures are described below).

Out of the 450 children initially pretested, we obtained full exposure data for 333, and complete pre-, exposure and posttest measures for 317. The breakdown into the two SES and the three age groups is given below.

	Low SES	Middle Class	Total
KG	N = 50	N = 43	N = 93
G-2	N = 47	N = 59	N = 106
G-3	N = 47	N = 71	N = 118
Total	N = 144	N = 173	N =317

Table 1

Composition of the Study Sample

To be able to specify exactly the extent to which exposure to the show affects cognition, multiple regression analyses were employed. Using these analyses it became possible to partial out posttest variance which was due to background variables and to pretest scores, and study the amount of posttest variance which was solely and uniquely associated with exposure to the show.* To put it differently, using multiple regression analyses we could state the amount of posttest variance which was uniquely accounted for by exposure to the show, everything else, as far as relevant background data was available, partialed out.

(b) The "Clinical observations"

To obtain more detailed information about attention and inattention patterns to various show segments, six groups composed of six children of each age and SES group were selected. These children were then invited on four occasions during the broadcasting season to watch the show. While viewing the show, each child was observed and his minute-by-minute behavior recorded. On each minute it was indicated whether a child attended, manifested inattention, or manifested active involvement in the show (e.g. laughed, gave advice, read the letters, sang).

This allowed us to study attention to the show as it developed over time, as well as to determine which type of segments were more "interesting" or more "boring".

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* Given those measures included as independent variables and whose contribution to the posttest scores was partialed out (see e.g. Cohen, 1968).

(c) The controlled experiment

75 second graders were randomly assigned to three groups: one group watched 8 hours of Sesame Street an hour a day; the second group watched a similar amount of hours of adventure films of a more traditional type; the third group watched nothing.

The purpose of this experiment was to study additional effects of the show (particularly perseverence and the ability to learn from a novel instructional film) which could not be studied in the field study.

Measures

(a) Background Data: For each child information was obtained regarding his age, family background (number of children at home, father's occupation) and his general exposure to movies, TV, ITV, and news broadcasts.

(b) Tests For KG

Most of the tests for KG were adapted from the ETS battery (Ball and Bogatz, 1970) which was used in the first year's evaluation of Sesame Street. However, certain items which required mastery of the English language were deleted (e.g. items based on the sounds of words such as "clock" and "rock"). These tests were employed on both pre- and on posttests. They are as follows:*

(1) Letter Matching (5 items); (2) Number Matching (5 items); (3) Picture-Number Matching (12 items); (4) Relational Concepts (7 items); (5) Parts of the Whole (9 items); and (6) Classification (18 items).

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* Detailed information about the tests can be found in Ball and Bogatz, 1970.

To these the following tests were added:

(7) CEFT: An adaptation from Witkin's Children's Embedded Figure Test to measure Field Independence (8 items)

(8) Ordering of Pictures: 3 sets of single pictures were shown and the child had to order each of them in a logical way (3 items).

(c) Tests for the schools

Three tests were identical to those employed in KG:

(1) CEFT, (2) Parts of Whole, and (3) Classification.

The following were tests designed by us for the study. They are assumed to reflect media-related cognitive skills

(4) Ordering of Pictures

Similar, though not identical to the KG test. Children had to indicate the right arrangement of pictures randomly presented (4 items).

(5) Points of View

Children had to choose a picture which showed how somebody else would see a given set of objects or landscape (3 items).

(6) Figure and Ground

Children had to enumerate details in a complex drawing but also identify the total pattern which was composed of the details, e.g. to recognize the number "5" which was composed of a flag, a sickle, and a moon (8 items).

(7) Close-up - Long Shot

The children were asked to select from among six variants the one which contained a detail presented in the stimulus picture (5 items).

(d) Test used in the Controlled Experiment

Classification and Parts of the Whole were employed as pretest aptitude measures as well as a general Sesame Street Retention Test (see section on Exposure measures).

There were the following posttest:

(1) Ordering of Pictures, (2) Points of View, (3) Figure and Ground (4) Close-up - Long Shot, all of which were used also in the field study.

In addition there were the following tests:

(5) Perseverence: Children were given 5 pages with tables and were asked to cross out all the numbers "7" (on pretest) or all the number "5" (on posttest). They were instructed that it would be desirable if they could continue this until they finished all pages, but could, if they wanted, stop whenever they desired.

(6) Learning from an Instructional Film: At posttest time, all children watched an Instructional film about the functioning of the heart. A multiple-choice comprehension and retention test then followed (10 items).

(7) Breaking Sets: Children were given a very simple classification item. The subsequent item highly resembled the preceding item and could be answered in the same fashion. However, a correct answer required the child to free himself from the preceding cognitive set and complete the classification along different lines. (6 items).

(e) Measures of Exposure

These measures were used in the field study. There were four measures. Three of these were based on data collected on six occasions as the program

progressed. On each of these occasions each child was asked about the amount of his viewing on "yesterday's" show, and also about his enjoyment. This was followed by a short content comprehension test. Thus we were able to obtain:

(1) An average viewing score

(2) An average enjoyment score, and

(3) An average comprehension score.

To test reliability of these measures a similar questionnaire was sent out to the parents of 120 children. The correlations between parents' and children's reports pertaining to viewing was .72.

At posttest time all children received a test which measured the children's familiarity with the program: The Sesame Street Retention Test (12 items).

Administration

All KG tests and Exposure measures were individually administered by trained testers. All school tests and measures were group administered.

Encouragement

The parents of half of the KG children were assembled on two occasions: Once at the very beginning of the broadcasting season, but after the pre-test was administered, and again two months later. The parents were urged to watch the show with their children, to give appropriate explanations and to encourage the children to watch it.

Results

For the sake of brevity, the report will be limited only to the main findings of the three studies.

A. Exposure: Viewing, enjoyment and comprehension of the show

As described earlier 333 children were interviewed six times over the four month period of the shows broadcasting season. The children were questioned about the amount of viewing "yesterday's" show, and their ability to answer 4 content questions.

(1) For how long did the children view the show?

On the average only 9% of the children did not watch the program at all, and 49% watched the entire program all the time. However, over time, there was a general downward trend in viewing. While in the beginning only 6% of the children did not watch the program at all, and 56% watched all of it, at the end of the season 37% watched the entire program.

Interestingly, low SES children watched in the beginning a bit less than middle class children, but over time they exceeded the latter. Toward the end of the season 11% more low SES children watched the show than middle class ones (figure 1).

When ages are compared one finds that on the average school children watched the program more than KG children. However, over time KG children overtook G-3 children (figure 2).

(2) To what extent did the children enjoy the show?

Including only those children who watched at least a part of the show we find, as with viewing, a decrease in enjoyment of the show. While

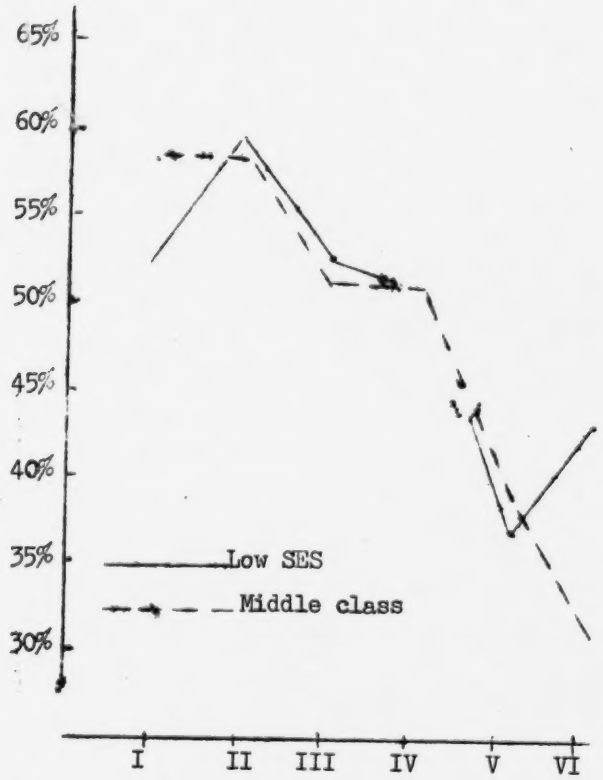

Fig. 1

Changes over time in percent of Low SES and Middle Class children viewing the entire show

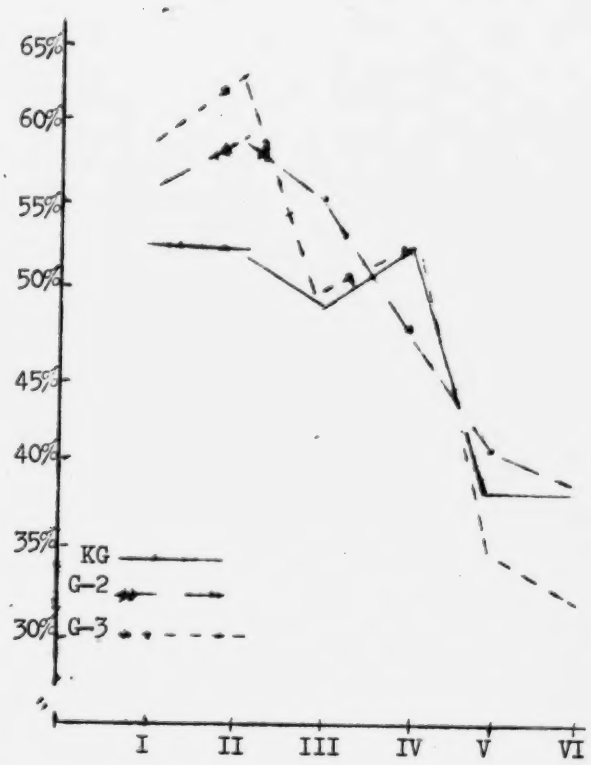

Fig. 2

Changes over time in percent of KG, G-2 and G-3 children viewing the entire show

at the outset 62% enjoyed the show "very much", only 46% enjoyed it at the end of the season. Similarly, while 22% did not enjoy it early in the season 42% did not enjoy it later.

With respect to SES differences, an already familiar pattern emerged: Low SES enjoyed the show less than middle class in the beginning, but overtook the latter as the season progressed (figure 3).

A similar pattern appeared when ages were compared: KG enjoyed less than G-3 children initially, but enjoyed the show far more than G-3 toward the end of the season (figure 4). Still, on the average, low SES children enjoyed the show less than middle class ones.

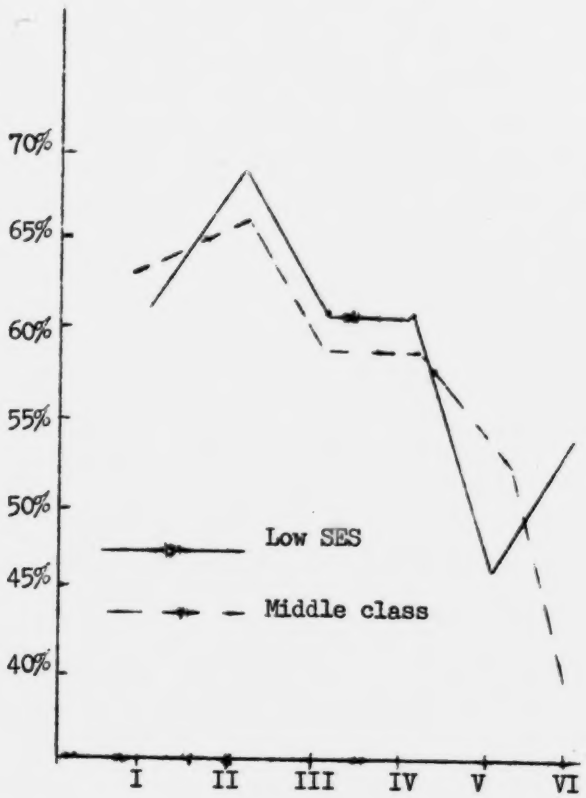

Fig. 3

Changes over time in percent of low SES and Middle Class children enjoying the show "very much".

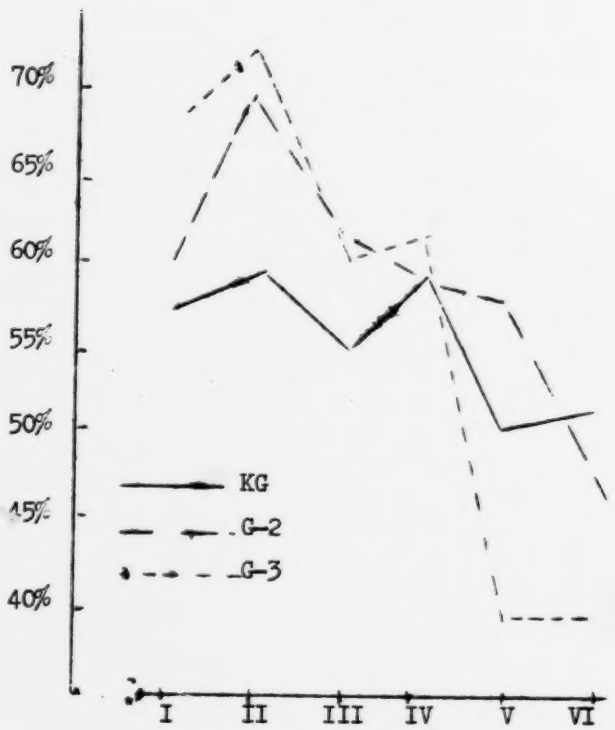

Fig. 4

Changes over time in percent of KG, G-2 and G-3 children enjoying the show "very much".

(3) How well did the children comprehend the program?

Comprehension of the program changed over time in a rather interesting fashion. Initially, comprehension was rather poor. Only 17% could answer all the content questions. Then the percent increased to 50% only to drop back to 34% toward the end of the season.

The median scores of comprehension over the six questionnaires are presented in figure 5.

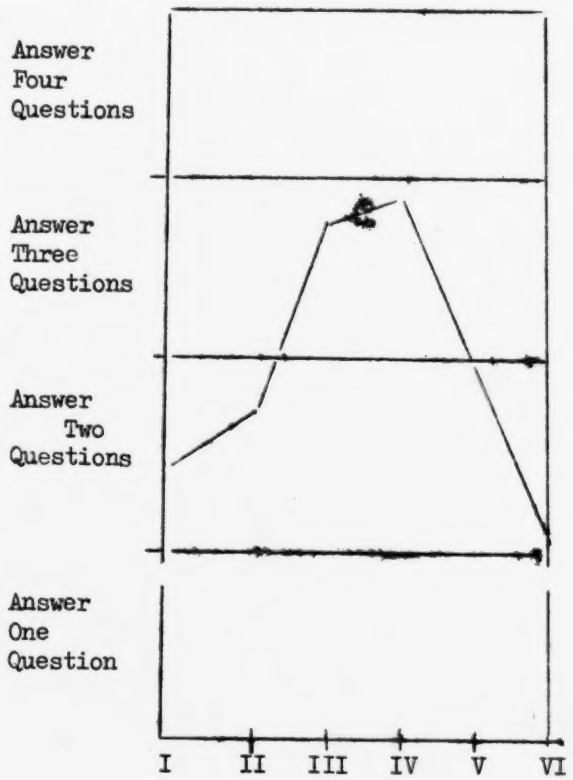

Fig. 5

Changes over time of median comprehension scores.

Such an inverted U shape pattern was not observed in either the

viewing or the enjoyment data. Indeed, the major difference between viewing and enjoyment on the one hand and comprehension on the other exists in the early phases of the broadcasting season. It was then that much viewing and much enjoyment were accompanied with little comprehension of the show's content. Apparently, the early days of exposure to the show were devoted to the mastery of the format of the show, hence the high degree of enjoyment with the concomitant low comprehension.

Comparison between the low SES and middle class children shed more light on this pattern: low SES children exhibited very poor comprehension of the show in the beginning, while the middle class ones had a far better start (6% versus 26% respectively answered all content questions). However, while the comprehension of low SES children gradually increased over time with only a negligible drop toward the end of the season, that of middle class children showed a rather dramatic decrease. In other words, it was the middle class children whose comprehension dropped as the season progressed, while that of lower SES did not. (see figure 6) It might be hypothesized that middle class children over time became less attentive to the show. Further analyses, to be reported below, provide data concerning the reliability of this hypothesis.

A similar pattern is observed when ages are compared. Again, the inverted U shape pattern repeats itself; it was the older children who displayed the larger drop in comprehension, although they continued to understand the show better than the KG children. (see figure 7).

In short then, middle class children and older children showed a dramatic downward shift in comprehension following increased comprehension

of the show's content. At the same time, comprehension of low SES and younger children is constantly improving.

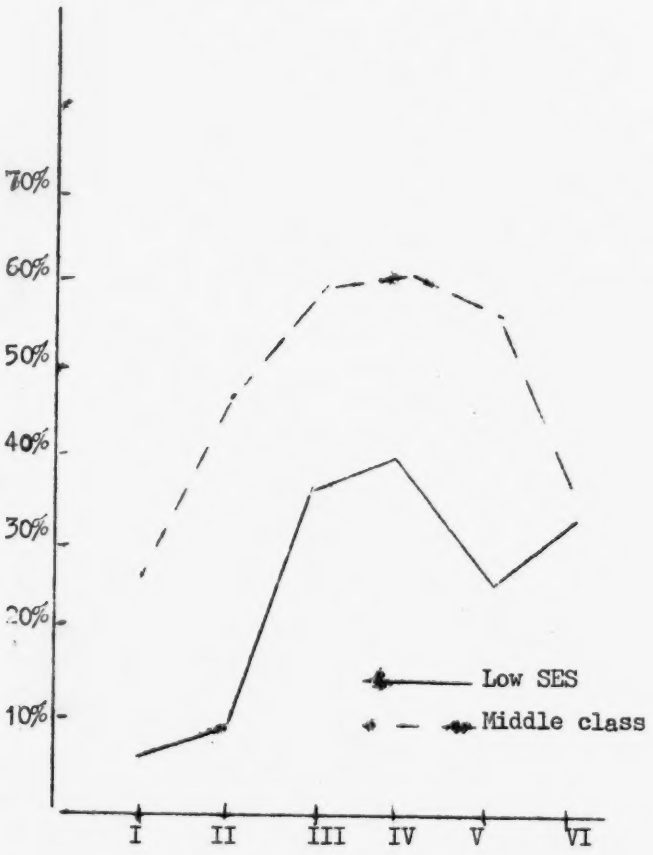

Fig. 6

Changes over time in percent of low SES and middle class children who answered all content questions.

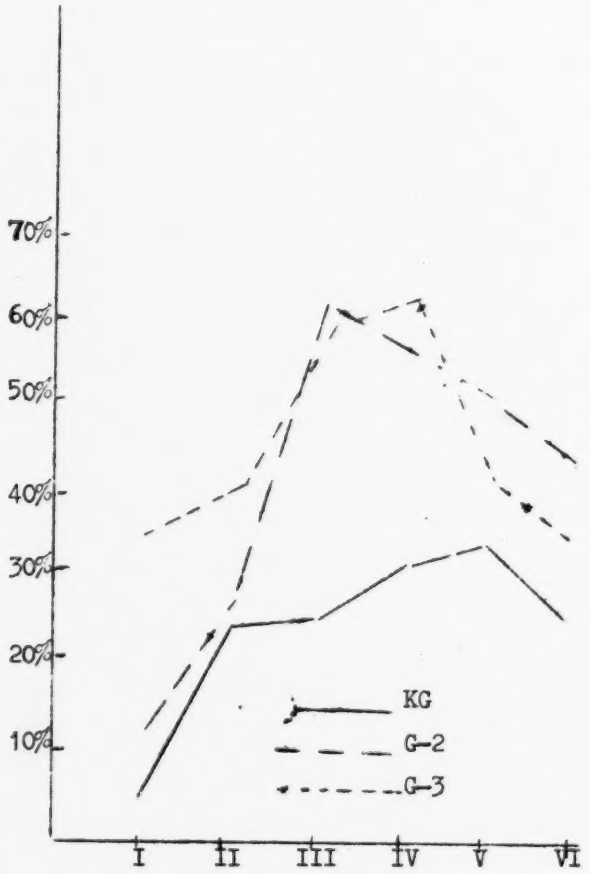

Fig. 7

Changes over time of KG, G-2 and G-3 children who answered all content questions.

(4) <u>How are viewing, enjoyment and comprehension of the show related to each other?</u>

We find that the three measures are highly inter-correlated. It is however interesting to note that these correlations increase from one date to another (see table 2), indicating that viewing, enjoyment and comprehension of content become closer related to each other as the season progresses. As has been noted earlier, comprehension was hardly related to either viewing or to enjoyment at the start of the season. (Table 2)

Period	Viewing and Enjoyment	Viewing and Comprehension	Enjoyment and Comprehension
I	.85*	.50*	.49*
II	.88*	.62*	.61*
III	.91*	.72*	.71*
IV	.91*	.75*	.74*
V	.89*	.73*	.71*
VI	.90*	.76*	.77*

* p .01

Table 2

Intercorrelations between viewing, Enjoyment and Comprehension

The high intercorrelations seem to indicate that self-reports of viewing and enjoyment are quite valid. However, the size of the correlations between viewing and comprehension are far smaller in the low SES group than in the middle class one. (Table 3)

Although the correlations in both groups increase over time, the differences between them do not decrease. In fact they become larger.

Period	Low SES	Middle Class
I	.50	.52
II	.54	.73
III	.67	.78
IV	.65	.84
V	.64	.78
VI	.70	.84

Table 3
comprehension
Intercorrelations Between and Exposure
in the Low SES and Middle Class Groups

Does this mean that self reports of the amount of viewing in the low SES group are less valid than those in the middle class group? If this were the case then the correlations between enjoyment (also self-reported!) and comprehension should also have been smaller in the low SES group. This, however, was <u>not</u> the case. The correlations in both groups range from 0.85 to 0.92 with no systematic differences between the groups.

Apparently the reason for the differences in the correlations between low SES and middle class indicates something entirely different. Viewing in the low SES group is less related to comprehension than enjoyment, i.e., viewing alone is not enough for these children to "register" the show's content. Something more is needed, viz., enjoyment. In the middle class group viewing accounts for far more comprehension.

There are some other interesting points to be noted. One finds for instance that while age is highly related to enjoyment of the show in the low SES group, it is unrelated in the middle class group (0.42 and 0.01 respectively). Similarly, while age is quite highly related to viewing and to comprehension in the low SES group, it correlates far less in the middle class group.

A similar pattern is revealed with respect to father's occupation. While father's occupation does relate highly to comprehension in KG, it does not at the grade-school level. (The correlation between occupation and comprehension in KG is 0.45, in G-2: -0.09, and in G-3: -0.24).

Generally then it appears that the show was rather demanding. Smaller and low SES children had a late start with the show. One may venture the hypothesis that it was the <u>format</u> of the show, rather than its content which made it more difficult for these children. Indeed, their experience with such television formats is very limited and their "TV literacy" rather low. Yet, as time passes and experience with the programs accumulates, ability to extract its message improves. Not so with older and middle class children. They are quick to adjust to the show's requirements. However, once adjusted and able to extract its content, they appear to find it somewhat childish. Thus, we witness a wide discrepency between format, which is highly demanding, and content, which is far more common.

Analysis of attention and inattention patterns to the program further corroborates our hypothesis.

B. Attention to the show

Measures of attention were taken in the "clinical" study in which 36 children of two SES levels and three age levels (KG, G-2, G-3) were personally observed on four occasions. Their minute-by-minute behavior was scored as either attentive, inattentive or displaying active involvement in the show.

(1) - How attentive were the children?

The first fact which emerged was that the patterns of attention were not different in the second half of a given show than from the first half. Thus, no changes of behavior due to the length of any show were observed. Changes in attention were connected to particular scenes rather than to the length of the broadcast.

Secondly, a general increase in active involvement is found and is accompanied by a decrease in inattention. It thus appears that as the children became more familiar with the show their active involvement (laughter, advice, singing) increased with it. (table 5)

1st Observation		2nd Observation		3rd Observation		4th Observation	
Active involv.	Inatten	Active involv.	Inatten.	Active involv.	Inatten.	Active involv.	Inatten.
10.35	23.9	15.4	13.7	16.8	9.8	18.5	9

Table 5

Percent of minutes of Each Show In Which More than Half the Children Displayed Active-Involvement or Inattention

As can be seen, active involvement increased by about 8% of the minutes, while inattention, which took place for nearly a quarter of the time in the beginning dropped to 9% of the time at the end.

However, this general trend conceals rather large differences between SES levels and ages. A breakdown into six age x SES groups reveals large differences in attention patterns.

In comparing the two KG groups (figure 6) we find that the decrease over time of inattention in the low SES group is quite hesitant, late and unsteady. It is far stronger, quicker and more systematic in the middle class group.

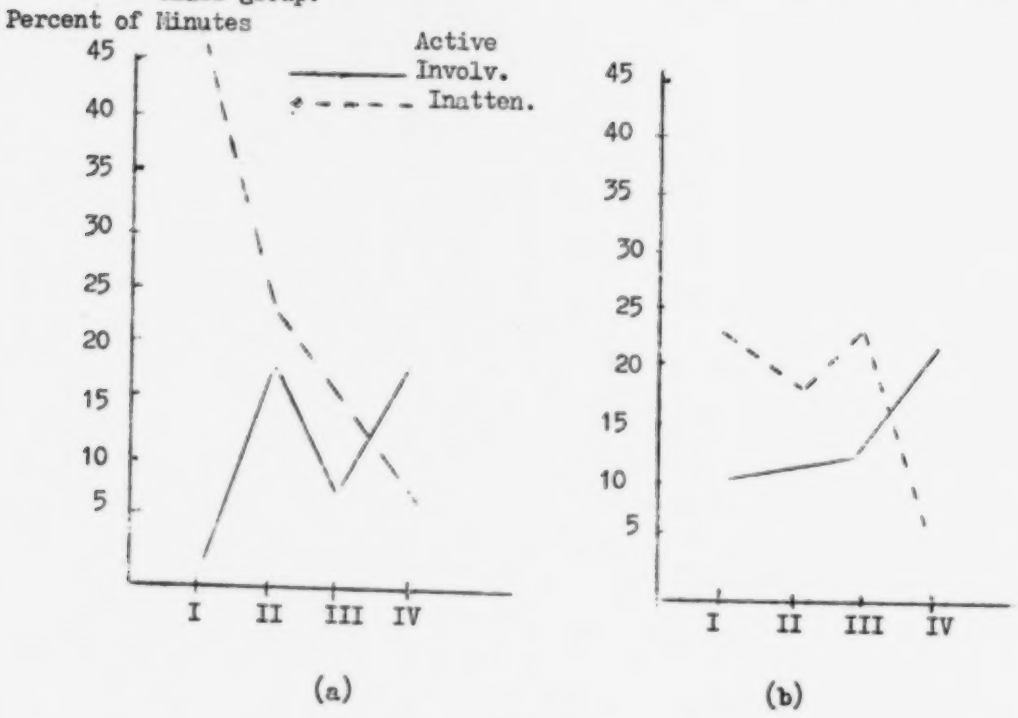

Figure 6

Changes in attention of middle class KG (a) and low SES KG (b)

Comparing the two G-2 groups (figure 7) we witness again the haphazard changes over time in the low SES group as compared with the steadier changes in the middle class group. It should be noted, however, that in spite of this, lower SES children turn out to be less inattentive than middle class ones, toward the end of the season. The latter become more inattentive.

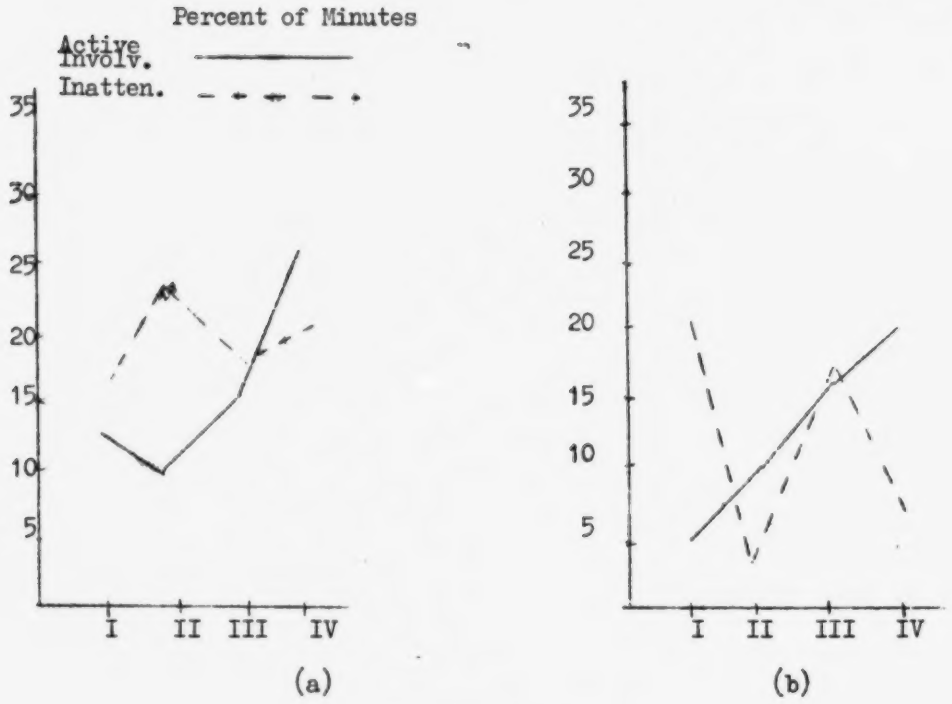

Figure 7

Changes in attention of G-2 middle class (a) and low SES (b)

This trend becomes even stronger when G-3 children are observed. Although inattention of G-3 middle class children starts out low and continues to decrease, active involvement decreases likewise. Not so in

the low SES. There the trend is in the opposite direction: Inattention decreases drastically while active involvement increases in huge increments. (figure 8)

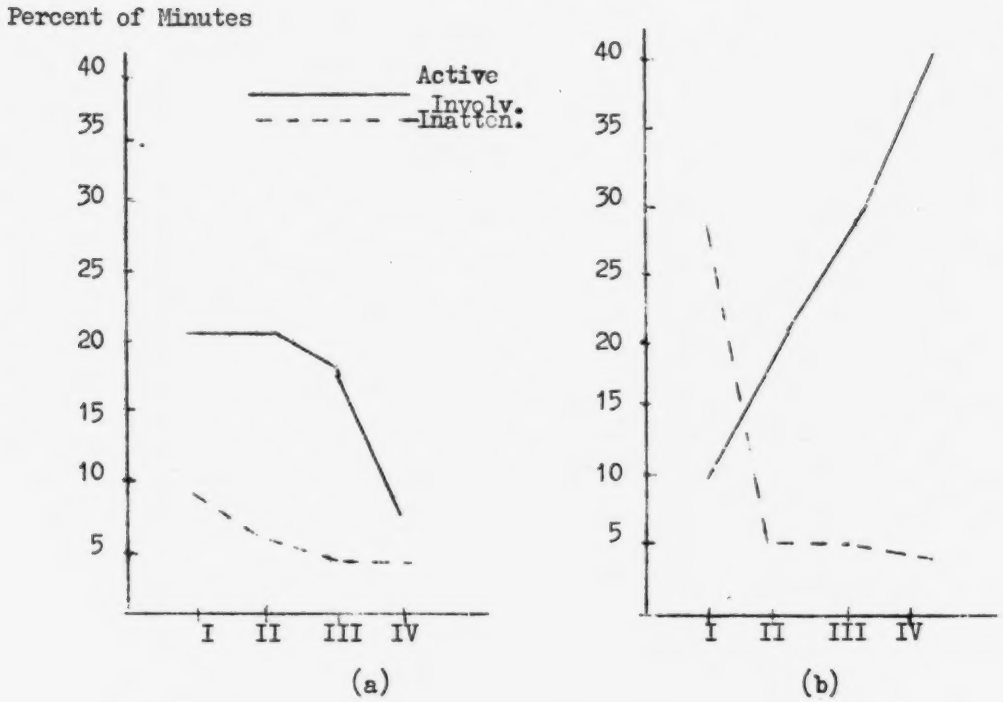

Figure 8

Changes in attention of G-3 middle class (a) and low SES (b)

If one were to judge the show's appeal to Israeli children on these graphs then he would conclude that the show is most appropriate for middle class children between KG and G-2 age and for low SES G-3 children. However, such a conclusion would be unwarranted at the moment given the small smaple which served for these observations.

(2) Which segments were "Interesting" and which ones were "boring"?

To answer this question content analysis of the program was done. Those segments to which more than half of the children were either inattentive or showed active involvement, on at least two occasions, were singled out. Since, however, certain segments were shown more than twice a percent of inattentive or involved behavior could be computed (Table 6).

In such a way 11 segments were singled out. Seven segments were identified as causing more than twice to more than 50% of the children to be inattentive, while another four were identified as causing, or "inviting" active involvement.

But what makes Geometric Forms, Songs, Stories, Instructional films (e.g. Where does the milk come from?), single numbers or letters, cause inattention? And what differentiates these segments from Solomon Grundy, Ernie and Bert, Bud and Jim and the numbers 1-10?

One possibility is that the underlying differentiating factor is the number of repetitions. However, this possibility must be ruled out given the fact that the Spearman Rank-Order Correlation between number of repetitions and amount of observed inattention is 0.10. The correlation with active involvement is not much higher. Thus, it is not the repetitions which cause inattention or active involvement.

Nor can the underlying factor be familiarity with the content of the segments: Some unfamiliar ones appear in the "boring" group of segments (e.g. letters) and some in the "involving" group (e.g. Solomon Grundy). The same applies to familiar contents.

Another possibility is that the factor which differentiates the two

Segment	No. of times Presented	No. of times inattention took place	No. of times active involvement took place
Songs	42	13 (31%)	2 (5%)
Geometric Forms	18	7 (38%)	2 (11%)
Letter Sounds	82	11 (13%)	7 (8%)
Stories	8	6 (75%)	2 (25%)
Jenny's Drawings	10	7 (70%)	0
Films	36	14 (39%)	7 (19%)
Single Numbers	50	11 (22%)	5 (10%)
Numbers 1-10	34	0	5 (15%)
Solomon Grundy	4	0	4 (100%)
Ernie and Bert	26	0	14 (54%)
Bud and Jim	26	0	13 (50%)

Table 6:

Segments which often aroused inattention or active involvement

groups of segments is the format: Those segments which contain a direct didactic element contribute to the children's inattention. This would apply to all the"boring" segments with the exception of Songs. The latter kind of segment, which is not didactic, may be "boring" because the songs are unknown to Israelis.

However, there is another factor involved: Underlying all the "boring" segments is the stress on the verbal side; underlying the "involving" segments is visual variability. Israeli children may not follow the verbal message accompanying, say, Ernie and Bert's dialogues. But there is enough in the segment to "feed the Eye". However, failing to follow the verbal explanations which accompany Letter Sounds there is not much of a story to do this visual feeding.

Interestingly enough, there is some similarity between the reaction of Israeli and American children to the show's segments. As reported by Ball and Bogatz (1970), American children showed the greatest interest in the segments with Ernie and Bert. Israeli children showed a similar high interest in these figures. Similarly, Books and Films were among the least interesting for American children as well as for Israelis. Films and songs were less interesting for 4 and 5 year-olds, when compared with 3 year-olds in the U.S. In Israel, where the children were 5, 7 and 8 years old, a similar pattern of little interest appeared.

(3) Summary

Overall, older and middle class children viewed the program more, enjoyed it more and comprehended it better. Younger and low SES children viewed less, enjoyed less and comprehended less. Yet, as the program progressed

older children began to view less, enjoy less and attended less, while an upward trend was observed in the younger and the low SES children. Apparently, the latter encountered initially difficulties with the program which they gradually overcame while older and middle class youngsters adjusted to the program much quicker. But once mastering the skills called upon by the show they found its content a bit childish and consequently viewed and enjoyed it less.

Attention was unrelated to the length of the broadcast but instead related to specific segments. It appeared that the more didactic, verbally loaded segments were less attended to than the more entertaining segments which entailed much visual variability. Yet, overall, while inattention tended to decrease over time, active involvement increased.

C. The Effects of the Program on Mental Capabilities

As mentioned earlier, the basic statistical analysis used here was that of Multiple Regression. This was done as a conservative method was necessary to allow inferences to be made concerning the extent to which exposure to the show "made a difference" in terms of the measured skills. It should be noted that we are refering to the net contribution of exposure, after all other contributing factors (e.g. SES, initial ability and the like) have been "partialed out". That is, we ask: How much does exposure to the show contribute to this or that skill, everything else being equal?

We will describe the program's effects first on KG children then on G-2 and G-3 children.

1 Kindergarten Children

(a) How much were KG children affected by the program?

Most of the measures employed with KG children were taken from the battery designed by ETS, and hence reflected the intended target-abilities of the show. In addition to these - Field Independence and Ordering of Pictures were measured since it was hypothesized that also these may be affected by the program.

As it happened, all skills, with the exception of Ordering of Pictures and Field Independence (CEFT) were affected by the program to a significant extent.

Over all children, the largest effect was on the test of Parts of the Whole: 13.3% of the posttest variance is attributed to the four

measures of exposure to the show*, ($F = 7.12$, $p < .01$). The second largest contribution over all children was on the test of Number Matching: 11.8% of the posttest variance is accounted for by the four measures of exposure ($F = 14.26$, p .001). Other tests were affected to a somewhat lesser extent (table 7).

However, when the children were divided into low SES and middle class groups (table 8), some abilities were found to be affected by the show to an even larger extent. 16.3% of the low SES children's ability to match letters was accounted for by the program. 17.8% of their Number Matching ability, 14% of their Picture-Number Matching ability, and 17.7% of their ability to handle Relational Concepts, are also accounted for by the program. It is interesting to note that in all the above mentioned cases, low SES children benefitted more from the program than middle class children. (In the middle class group only 4.3% of Matching Numbers Test, 4.2% of Relational Concepts test and 10% of the Picture-Number Test are accounted for by the program).

On the other hand, middle class children benefitted more than low SES on the Test of Parts of the Whole and the Classification Test (18.3%, $F = 6.9$, $p < .05$ and 14.3%, $F = 6.98$, $p < .05$ respectively).

It seems possible that the program had a stronger effect on the more specific, analytic abilities of low SES children (the tests of Matching and of Relations). At the same time it had a stronger effect on abilities of synthesis in the middle class group (Parts of the Whole and Classification). This possibility is further corroborated when G-2 and G-3 are examined.

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* Their non-redundant contributions were added up and a combined F ratio computed.

Source of contribution to variance / Variance of test accounted for	SES	All background variables	All pretest measures	Total	Exposure	F	P
Viewing	4.6%	49.0%	5.0%	58.6%			
Enjoyment	6.3%	18.9%	17.3%	7.2%			
Comprehension	13.4%	17.3%	16.6%	47.3%			
Sesame Street Retention	24.6%	7.2%	12.7%	44.5%			
Matching Letters	0	2.7%	19.2%	21.9%	5.2%	4.71	$< .05$
Matching Numbers	8.7%	13.2%	12.6%	34.5%	11.8%	14.26	$< .01$
Picture-Number Matching	13.2%	6.6%	22.7%	42.5%	7.8%	9.84	$< .01$
CEFT	3.2%	3.2%	15.5%	21.9%	4.0%	3.64	$> .05$
Parts of whole	0.7%	8.8%	11.8%	20.3%	13.3%	7.12	$< .01$
Relational concepts	11.3%	11.1%	17.2%	39.6%	3.8%	4.53	$< .05$
Classification	24.7%	4.7%	24.3%	53.7%	8.4%	12.95	$< .01$
Ordering Pictures	35.9%	7.1%	8.8%	51.8%	1.4%	2.45	$> .10$

Table 7

Amount of KG posttest variances accounted for by the combined Exposure measures after partialing out background and pre-test effects (Multiple Regression)*

* The same statistical approach is used in analysing the data which appears in tables 8,9,10,12,13,14.

Source of contribution to variance / Variance of test accounted for	All background Variables		All pretests		Total		Exposure					
	Low SES	Mid. class	Low SES	Mid. class	Low SES	Mid. class	Low SES F	Low SES P		Middle Class F	Middle Class P	
Viewing	37.4%	22.4%	26.1%	26.4%	63.5%	48.8%						
Enjoyment	26.0%	17.3%	23.2%	52.7%	49.2%	70.0%						
Comprehension	37.6%	29.0%	28.3%	45.9%	65.9%	74.9%						
Sesame Street Retention	20.2%	12.6%	25.7%	48.9%	45.9%	61.5%						
Matching Letters	26.7%	14.8%	21.1%	36.0%	47.8%	50.8%	16.3%	5.4	<.05	4.3%	1.96	
Matching Numbers	25.2%	38.2%	31.3%	16.6%	56.5%	54.8%	17.8%	7.3	<.05	11.0%	4.5	<.05
Picture-Number Matching	16.8%	14.1%	45.2%	46.8%	62.0%	60.9%	14.0%	5.2	<.05	10.1%	4.76	<.05
CEFT	15.3%	3.7%	28.5%	28.4%	44.8%	32.1%	5.1%	2.2		9.6%	3.75	
Parts of Whole	20.9%	19.0%	27.6	17.8%	48.5%	36.8%	6.6%	3.6		18.3%	6.9	<.05
Relational concepts	16.9%	16.1%	26.4%	39.1%	43.3%	55.2%	17.7%	8.1	<.05	4.2%	2.1	
Classification	8.2%	30.1%	52.3%	24.3%	60.5%	54.4%	9.2%	4.8	<.05	14.3%	6.98	<.05
Ordering Pictures	14.0%	29.1%	27.3%	28.9%	41.3%	58.0%	5.3%	2.1		7.4%	3.4	

Table 8

Amounts of KG Low SES and middle class posttest variances accounted for by the combined four measures of Exposure

Generally, then, the program appears to have a noticeable effect on KG children's skills, although, as it will be seen below, it is smaller than in G-2 and G-3.

(b) Does the encouragement of parents make a difference?

The parents of half the KG children were urged to watch the show with their children, explain it and elaborate on its content. It was found that encouragement had a relatively strong net effect on the amount of viewing of low SES children (8.6% of the viewing variance is accounted for by encouragement) but a very small contribution in the middle class group (see table 9). This difference is even larger in terms of the enjoyment of the show: 23.6% of the enjoyment variance in the low SES group is accounted for by encouragement and none in the middle class group. Comprehension of the show is affected in a similar fashion (6.1% in low SES, 0.04 in middle class).

Interestingly enough, encouragement had hardly any direct effect on posttest performance. The only skill affected by it was Field Independence as measured by CEFT, where 13.0% ($F = 5.17$, $p < .05$) of the variance was accounted for by encouragement in the middle class group (5.7% in the low SES group). As we will see later, CEFT is much more affected in G-3, thus suggesting that age (or parents' help) are needed to affect this ability.

Encouraging parents to watch the show with their children did not contribute directly to the children's abilities after all the other contributing factors, including exposure, have been partialed out. However, encouragement may have an indirect effect thus causing background factors,

Variances Accounted for on ...	Total Group		Middle Class		Low SES	
	Net % of Variance	F	Net % of Variance	F	Net % of Variance	F
Viewing	2.6	3.04	3.5	1.63	8.6	8.92**
Enjoyment	7.0	9.63**	0.3	0.22	23.6	25.2**
Comprehension	3.4	4.95*	0.4	0.32	6.1	6.28*
Sesame Street Retention	6.2	9.50**	2.7	1.65	6.3	3.68
Matching Letters	4.2	4.20*	7.7	3.72	0.9	0.61
Number Matching	1.1	1.46	0.1	0.03	0.2	0.17
Picture-Number Matching	0.1	0.18	1.8	0.90	0.8	0.96
CEFT	9.1	9.39**	13.0	5.17*	5.7	3.25
Parts of the Whole	0	0	0	0	5.4	3.42
Relations	2.2	2.74	1.9	0.88	0	0
Classification	0.5	0.86	0	0	2.1	1.85
Ordering of Pictures	1.7	2.62	0.1	0.04	0.2	0.10

* $p < .05$
** $p < .01$

Table 9

Net amounts of variances accounted for by encouragement - non-encouragement of KG parents

particularly SES, to contribute less than expected to abilities. In other words, encouraging parents to watch the show with their children may "crease" or decrease the impact of SES differences.

Indeed this was the case. Comparing the extent to which SES differences accounted for differences in abilities, we find large and systematic differences between the encouraged and non-encouraged groups (table 10).

In eight out of twelve measures (including the four measures of exposure) SES differences accounted for large portions of the posttests' variances in the non-encouraged group, but for little or no variance in the encouraged group. For instance, while SES differences accounted for 34% of the Picture-Number variance in the non-encouraged group, they account for less than 1% in the encouraged group.

In the remaining four cases there is either no difference between the groups or, as in CEFT, SES appears as a stronger factor in the encouraged group. It appears that in the case of Field Independence encouragement even strengthens SES differences in favor of the middle class children.

(c) What was the impact of initial ability on benefits from the show?

Middle class children exhibited higher levels of abilities than low SES children on all pretests (table 11).

However, as has been seen, middle class children did not benefit more than low SES children on several tests. In fact, they gained more from the program on two tests only, while low SES children gained more on four other tests. Moreover, the gaps between the two SES levels, which existed at pretest time, decreased substantially at posttest time on most tests. It is as if low SES reached the performance levels of middle class on these tests.

Group	Encouragement		Non-encouraged	
Variance accounted for on ...	Net % of Variance	F	Net % of Variance	F
Viewing	4.5	2.21	27.6	16.00**
Enjoyment	0.8	0.37	19.4	10.12**
Comprehension	5.5	2.72	31.2	19.01**
Sesame Street Retention	31.2	21.30**	25.7	14.53**
Matching Letters	4.3	2.12	12.6	6.06*
Matching Numbers	12.4	6.65*	6.5	2.95
Picture-Number Matching	0.9	0.45	34.0	21.65**
CEFT	21.7	13.04**	0.2	0.06
Parts of the Whole	3.6	1.78	0.1	0.02
Relational Concepts	5.6	2.80	19.8	10.35**
Classification	16.5	9.29**	36.5	24.19**
Ordering Pictures	28.7	18.97**	44.0	33.02**

* $p < .05$

** $p < .01$

Table 10

Net amount of variances accounted for by SES in the encouraged and non-encouraged KG groups

Test	PRETEST SCORES				POSTTEST SCORES			
	Low SES (N=65)		Middle class (N=55)		Low SES (N=58)		Middle class (N=43)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Matching Letters	3.04	1.11	3.81	1.05	4.76	1.93	4.77	2.20
Picture-Number Matching	8.98	1.75	10.76	0.98	10.53	1.93	11.63	0.65
Number Matching	2.94	1.19	7.36	1.18	4.07	1.18	3.14	1.98
CEFT	3.35	1.77	5.03	1.75	5.58	1.42	6.14	1.95
Parts of the Whole	4.00	2.33	6.12	2.04	5.91	2.23	5.42	3.27
Relational Concepts	4.27	1.33	5.71	0.93	5.43	1.40	6.37	1.04
Classification	6.64	3.98	10.16	3.44	8.81	4.44	13.00	2.72
Ordering of Pictures	0.84	0.95	1.81	1.02	2.07	0.97	0.81	0.79
Sesame Street Retention	-	-	-	-	3.33	2.94	7.09	3.50

Table 11

Mean pre-test and posttest scores
for Low SES and Middle class
KG children

Scores on the pretests account, in general, for varying portions of the variance of every posttest (the highest is in the Classification Test: 24.3%).

Scores on pre-tests accounted, however, for large portions of the exposure variances (tables 7 & 8). Interestingly enough, the initial ability had a far stronger impact on enjoyment, comprehension and retention of the program in the middle class group than in the low SES group (e.g. initial ability accounted for 52.7% of the enjoyment variance in the middle class group and only 23.1% in the low SES group).

We are led to conclude that those who are initially more capable watch more, enjoy more, comprehend more, and retain more. But, this does not mean that they gain more from the program. In fact, while pre-test ability accounted for relatively large portions of posttest variances, it was often the case that the low ability children were the ones to benefit more (e.g. in the case of Matching Letters, where the low SES children scored initially lower than middle class ones but benefitted more from the show).

Thus it appears that initial ability influenced exposure: Those who knew more watched and understood more. But this did not effect directly the amount learned from the program. In some cases it was the less able children who benefitted more in other cases it was in the opposite direction. We can therefor only say that ability is related to exposure, but not directly to how much is gained from the program.

(d) Summary

Most of the measured abilities were positively affected by exposure

to the program. These effects can be directly attributed to the program since posttest variances which were accounted for by background variables and pre-test abilities were partialed out.

Low SES children benefitted more than middle class children in terms of the various matching and other analytic abilities. The converse was true for middle class children when their abilities of synthesis were examined.

Encouraging parents to watch the show with their children had a particularly strong effect on low SES children's exposure to the show, but nearly none on middle class. But encouragement tended to "erase" or decrease the impact of differences of SES on posttest performance, thus making low SES children benefit from the program nearly as much as middle class children.

As in the American study (Ball and Bogatz, 1970) those children who watched more and comprehended more gained more. Initial levels of ability, as measured by the pre-tests, had a profound effect on exposure to the program and on its comprehension. This was particularly strong in the middle class group where 26.4% of exposure variance, 52.7% of the enjoyment variance, 45.9% of the comprehension variance and 48.9% of the Sesame Street Retention variance were accounted for by initial ability.

Yet, although more exposure generally led to more learning from the program, initial ability did not. That is, initial ability accounted for large portions of posttest variances, but it made no systematic difference in terms of how much was gained from the program.

2. Grade-School Children

Although some of the ability measures employed with G-2 and G-3 children were identical to those employed in KG (Classification, Parts of the Whole, and CEFT), the majority of the tests were different and reflected our interests in media related abilities. As with KG children, our major concern was with the **net** contribution of exposure to the children's abilities.

(a) How much were school children affected by the program?

Considering first the CEFT, Classification and Parts of the Whole Tests, which were identical to those employed in KG, we find that grade-school children were affected more than KG children. That is, exposure to the program made a larger difference in these youngsters' abilities than it did in the KG children (table 12).

Thus we find that 9.3% of the variance on CEFT ($f = 24.6$, $p < .001$), 23.6% of the variance of the Parts of the Whole Test ($F = 52.8$, $p < .001$) and 23.7% of the variance on the Classification Test ($F = 58.3$, $p < .001$) were accounted for by exposure to the program.

Also performance on the "media literacy" tests was significantly affected by the program (Points of View: 10.7%; Picture Ordering: 9.1%; Figure and Ground: 11.7% and Long-Shot - Close Up: 14.4%). It is clearly seen that also these, unintended abilities are influenced by the program.

Comparing the benefits of low SES with middle class (table 13) it becomes evident that middle class youngsters benefitted far more than low SES on all tests, except for CEFT where low SES benefitted more than middle class children. The largest difference is on the Figure and Ground Test.

Variance of test accounted for / Source of contribution to variance	SES	All background variables	All pretests	Total	Exposure F	Exposure P
Viewing	1.8%	3.7%	2.6%	8.1%		
Enjoyment	19.0%	3.8%	3.0%	25.8%		
Comprehension	22.3%	4.8%	4.9 %	32.0%		
CEFT	1.5%	4.1%	15.7%	21.3%	9.3% 24.6	<.001
Parts of the Whole	0.6%	2.6%	6.0%	9.2%	23.6% 52.8	<.001
Classification	3.2%	4.5%	9.1%	16.8%	23.7% 58.3	<.001
Ordering of Pictures	3.2%	3.3%	16.7%	22.2%	9.1% 23.0	<.001
Point of View	8.4%	2.3%	6.5%	17.2%	10.7% 26.6	<.001
Figure and Ground	1.2%	9.5%	11.3%	22.0%	11.7% 30.7	<.001
Close-up - Long Shot	4.5%	9.4%	2.7%	16.6%	14.4% 35.3	<.001

Table 12

Amounts of School posttest variances accounted for by the combined four measures of Exposure

Group	Low SES		Middle Class	
Variance accounted for on ...	Net % of Variance	F	Net % of Variance	F
CEFT	12.2%	6.16*	7.6%	14.50**
Parts of the Whole	19.9%	17.10**	29.1%	40.23**
Classification	16.2%	14.92**	31.1%	44.75**
Ordering of Pictures	6.8%	6.59*	12.2%	19.91**
Points of view	12.6%	10.37**	16.9%	25.00**
Figure and Ground	3.8%	3.38	17.9%	33.84**
Close-up - Long shot	12.4%	11.13**	24%	37.43**

* $p < .05$

** $p < .01$

Table 13

Amount of net variance on posttests accounted for by Exposure in the low SES and the middle class groups

The fact that low SES children benefitted more from the program than middle class on CEFT, corroborates our previous findings. CEFT is a well-known analytic test. It is also the only clearly analytic test included in this battery. As was previously suggested it is apparently in the domain of analytic abilities that low SES children gain more while middle class ones benefit more in abilities of synthesis. However, it is difficult to provide unequivocal evidence to support this claim.

Although middle class children benefitted more, the extent to which low SES children were affected by the program should not be underestimated. Their gains were particularly high on Parts of the Whole (19.9%) and Classification (16.2%).

In comparing the extent to which G-2 children benefitted from the program with that of G-3 a very clear pattern emerges. Children of both grade levels benefitted from the program on all tests, but G-3 children gained consistently more. The largest difference between the gains of the two grade levels is in Close-Up - Long Shot where 28.4% of the G-3 variance is accounted for by the program versus only 8.1% of the G-2 variance (table 14).

It thus turns out that the older children, and in all but one case, also those from a higher SES, benefit more from the program than younger children and those who come from a lower SES.

In summary, it is important to note that the program, originally designed for American preschoolers, has a most profound effect on Israeli G-2 and G-3 youngsters. Moreover, not only are there very strong effects on those cognitive functions deliberately aimed at, but also other

Grade / Variance accounted for on	Grade 2 Net % of Variance	Grade 2 F	Grade 3 Net % of Variance	Grade 3 F
CEFT	7.7	9.69**	13.3	17.00**
Parts of the Whole	17.0	21.28**	25.5	26.06**
Classification	17.6	23.27**	24.9	27.46**
Ordering of Pictures	6.5	8.2**	11.5	13.69**
Points of view	9.6	13.48**	12.5	15.13**
Figure and Ground	18.7	24.12**	10.8	11.70**
Close-up and Long Shot	8.1	9.18**	28.4	32.83**

** $p < .01$

Table 14

Amount of net variance on posttests accounted for Exposure in G-2 and G-3

abilities - apparently those called upon by the television "language" employed by the program - are changed by it.

(b) What were the effects of the program in the controlled experimental setting?

As will be recalled, a controlled experiment was conducted with 75 second graders who were randomly divided into three groups: One group was exposed to eight hours of Sesame Street (film projected in color), another exposed to eight adventure films, and the third served as a control group and saw no films whatsoever.

The most important findings of the experiment were as follows:

(1) A significant and noticeable decrease in children's perseveration which was a function of exposure to the eight hours of Sesame Street. The difference between the Sesame Street and the adventure films conditions accounts for 13.6% of the variance on the test of perseveration. A comparison between the two groups shows a significant difference between them on the posttest in favor of the adventure film condition: the mean perseverance score of the Sesame Street group dropped significantly from pre- to posttest (mean at pre-test time: 164.2, and at posttest time: 137.3). The same did not occur in the other groups.

(2) A significant improvement in the children's ability to extract information from an Instructional film as a function of participation in the Sesame Street condition. The difference between that condition and the adventure film condition accounts for 6.2% of the variance ($p < .05$), in favor of the Sesame Street condition.

(3) There were no significant changes in the test of Breaking Sets, although this was expected. Nor did "media literacy" change to a significant extent.

The experiment was conducted very late in the season, and most children have already had much exposure to Sesame Street. In fact, their "media literacy" scores on the pre-test were already quite high leaving little room for improvement.

(4) However, a very clear interaction between initial familiarity with the program and the experimental treatments emerged when posttest scores on Close-Up - Long Shot were examined. The correlation between the Sesame Street Retention Test and the media literacy test were very high in the adventure-film and control groups, but zero in the Sesame Street group (see the regression lines in figure 9).

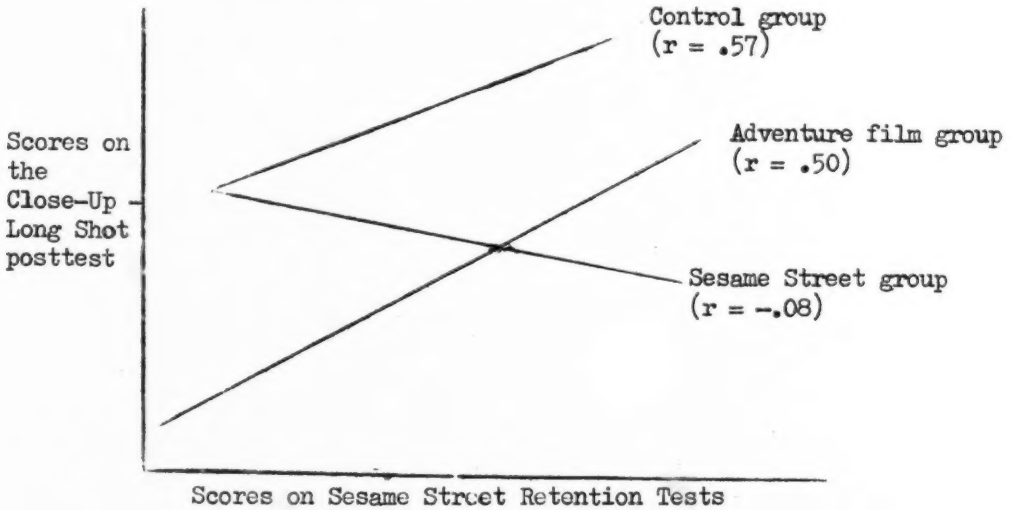

Fig. 9
Interactions between Sesame Street Retention and the Experimental Conditions

Thus, while initial familiarity with the program was strongly associated with the scores on that test, additional exposure to the program, as done in the Sesame Street condition, erased that association. The eight hours of Sesame Street "made up" for the low media literacy of the less exposed children thus making the high-exposure ones have no advantage.

(c) What was the impact of initial ability on the benefits from the show?

In general, initial (pre-test) ability accounted for moderate to small portions of the Exposure variances. That is, differences in initial ability were only very moderately related to Exposure measures (table 12). The stronger impact of initial knowledge on Exposure measures was in the low SES group (between 7.0% and 15.4%), when compared with the middle class group (between 3.5% and 10.5%). This pattern differs from the one observed in KG in two ways. First, initial ability made a far larger difference in KG in terms of exposure to Sesame Street in KG, indicating a very strong association between ability and Exposure. Second, the association within KG is stronger in the middle class group (ranging between 26.4% to 52.7%) than in the low SES group (ranging there from 26.1% to 28.3%).

Initial ability was also only moderately related to posttest performance (the strongest association was between initial ability and Picture Ordering: 13.1% for the entire sample; 16.7% for low SES, 17.2% for middle class, 15.5% for G-2 and 18% for G-3).

Such relatively small correlations between ability and Exposure, and between ability and posttest performance tend to further corroborate our previous contention that gains from the show are not directly related to initial ability. In the sample of school children it is not even indirectly related.

Moreover, as can be seen in table 15 low SES pre-test scores are not always lower than those of middle class youngsters. Nor do G-2 children

Pre-tests	LOW SES (N=88)		Middle Class (N=162)		Grade 2 (N=136)		Grade 3 (N=114)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
CEFT	5.13	1.46	5.46	1.30	5.19	1.33	5.54	1.40
Parts of the Whole	4.97	2.1	4.98	1.88	4.85	1.95	5.10	1.93
Classification	7.57	2.9	6.73	2.73	6.48	2.70	7.70	2.84
Order of Pictures	0.75	0.83	1.13	0.80	0.98	0.82	1.02	0.85
Points of View	1.21	0.89	1.48	0.84	1.49	0.88	1.27	0.79
Figure and Ground	1.62	1.29	2.43	1.23	1.99	1.16	2.33	1.45
Close-up and Long Shot	3.13	0.95	2.88	1.71	3.34	0.93	2.52	1.88

Posttests	LOW SES (N=85)		Middle Class (N=144)		Grade 2 (N=121)		Grade 3 (N= 108)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
CEFT	6.23	1.58	6.66	1.36	6.24	1.45	6.79	1.41
Parts of the Whole	8.06	2.13	8.42	1.63	8.23	1.87	8.35	1.80
Classification	9.76	2.93	10.90	2.83	9.97	2.91	11.04	2.83
Order of Pictures	1.26	1.06	1.72	1.14	1.24	1.04	1.90	1.13
Points of View	1.29	0.89	1.91	0.92	1.41	0.90	1.99	0.93
Figure and Ground	2.67	1.41	3.05	1.58	2.44	1.33	3.44	1.57
Close-up - Long shot	3.55	1.36	4.15	1.15	3.62	1.29	4.28	1.14
Sesame Street Retention	6.78	3.43	8.53	3.39	7.52	3.40	8.28	3.59

Table 15

Mean pre- and posttest score of the grade school group

have poorer pre-test scores than G-3 children on all pretests. In fact, middle class children performed poorer than low SES on the Classification Test, and G-3 performed poorer than G-2 on the Close-Up - Long Shot Test. These differences are small but they clearly rule out the possibility that those who started out better, also learned more from the show.

(d) Summary

We have found that exposure to Sesame Street has a rather strong impact on the measured cognitive skills. The strongest effects are on Classification and Parts of the Whole. The impact on these and on Field Independence (CEFT) is far stronger than was observed in KG.

Both low SES and middle class youngsters gain from the program, but middle class children benefit more on all tests except for on CEFT. Low SES benefit far more on that test. This appears to lend some additional support to our hypothesis that Sesame Street affects the more analytically loaded abilities of low SES children and more the abilities of synthesis in middle class ones.

We found also G-3 children to consistently gain more than G-2 children.

It is interesting to note, in passing, that the gains from the program of grade school low SES children on CEFT, Parts of the Whole and Classification are only slightly larger than those of middle class KG children. A similar comparison was noted in our analysis of attention and inattention patterns.

Finally, no direct or even indirect relationship between initial ability and amount of gain from the program was found. Given the small

differences between pre-test scores of G-2 and G-3 it remains unclear why G-3 gained so much more than G-2 children.

D. Discussion and Conclusion

Our conclusions are at present quite tentative and should therefor be subject to further analyses and discussions.

The first item of note is the very strong effect of Sesame Street on most of the ability measures employed. It is also very interesting that grade school children's (G-2 and G-3) performance on the posttests had much stronger associations with Exposure to Sesame Street than the performance of KG children.

Two questions should be raised in light of these findings: Firstly, what accounts for the large age differences? Second, what accounts for the larger-than-expected gains from the program?

With regard to the age differences we encounter little difficulty in explaining them. Smaller children (KG) viewed the program on the average less than G-2 and G-3 children (mean viewing scores as measured on six occasions were 3.2, 4.1 and 4.2 respectively). KG children comprehended the program far less well than G-2 and G-3 children (the mean comprehension scores are 1.65, 3.6 and 3.7 respectively). Finally, the mean Sesame Street Retention scores of KG were far lower than those of G-2 and G-3 (the means are 5.13, 7.65 and 8.26 respectively). If it was Exposure to the show which in fact contributed more to the ability of grade school children than to the abilities of KG children, then the differences in viewing, comprehension and retention are the right explanation.

However, this raises the second question. Was it the exposure to the show which contributed so much to posttest performance? It is important to note that in both KG and in grade school the one single most contributing factor, out of the four measures of Exposure, was Sesame Street Retention Test. The associations between posttests and the other measures of Exposure were far weaker than with our Sesame Street Retention Test. This test, which was composed of content question that only a viewing child could answer, entailed apparently a general ability factor. It is only reasonable to assume that the test measured intelligent exposure to the show, including its comprehension, rather than sheer viewing. This association between the test and comprehension of the program should be particularly strong in KG where the largest differences in comprehension are found. Indeed, the correlation there is 0.61 while in grade school it is 0.35.

The Sesame Street Retention Test was not the only component of Exposure which was related to posttest performance, although it had the strongest association. Also enjoyment of the show had an effect, but it was mainly indirect. Sesame Street Retention scores correlated 0.43 with enjoyment in the KG group, but not at all in the school group. In the KG group the correlation was higher for the low SES (0.47) than for the middle class (0.23) group. Enjoyment of the show contributed also to the variance of some KG posttests (7.6% on Picture-Number Matching, 5.4% on Relational Concepts, 3.5% on Classification). Such contributions took place only in the low SES group, suggesting that enjoyment has some moderate effect on how much is learned by low SES KG children. Enjoy-

ment makes no difference in learning in middle class KG children or school children.

We are led to conclude that the observed effects of the program are due mainly to the intelligent viewing of it. No wonder therefor that older children benefitted more. This is further corroborated by the facts that KG children needed a longer time to adjust to the program's format and that SES differences had a very strong influence on the performance of non-encouraged KG children.

Does this mean that Sesame Street, once transferred to a "less televized" country, in comparison to the U.S.A., is inappropriate for KG children? The answer is obviously negative. Firstly, KG benefitted a great deal from the program in, at least, the intended cognitive goal areas. Secondly, we have not measured the KG children's "media literacy". In light of the gains school children made in "media literacy", one would expect KG also to have benefitted in these areas, even if to a lesser extent.

Clearly, the program is very demanding. It is demanding psychologically, due to its unique format which it quite unfamiliar to non-American children. Yet, this demanding format has a profound effect on specific abilities which are called upon for proper information extraction. The fact that the children in the Sesame Street experimental condition became better learners from an Instructional film is an important point to notice. It was mediated, apparently, by improved skills in extracting information from the medium. Other measures of "media literacy" such as Ordering of Pictures and Close-Up - Long Shot were also affected by Sesame

Street in the experiment, although to a less significant extent.

It thus seems that "media literacy" can be affected by a TV program which calls upon such skills. But not only media related skills are incidentally learned. Perseveration, as we saw was also affected, however in a negative direction. This suggests that a show like Sesame Street may not only teach skills by calling upon them but also by modelling them overtly. In the case of perseveration it was, quite likely, the pace of changes and shifts in the show which had the effect. Indeed, one of the original assumptions of the program's creators was that Inner City American children are not highly perseverent and thus display short attention spans. What seemed to agree with already existing tendencies in the U.S.A., appears to have a profound effect in the same direction in another country.

In general, a show like Sesame Street may perhaps be less "instructional", in the usual sense. Indeed, as it has been shown, low SES KG comprehended the content of the show very poorly. However, while not very effective in the short-run informational sense, a show such as Sesame Street may have much stronger effects on cognitive functions particularly those which are displays or called upon by it. In this sense, such a demanding show may be quite effective in the long run particularly in countries in which exposure to the visual media, and hence "media literacy", are relatively low.